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have not succeeded in obtaining a satisfactory geometrical definition; but the search after it led to a variety of theorems, relating chiefly to the first-mentioned curve, and the results of the investigation are contained in the present memoir. Some of these results are due to Mr. Salmon, with whom I was in correspondence on the subject. The character of the results makes it difficult to develope them in a systematic order; but the results are given in such connexion one with another, as I have been able to present them in. Considering the object of the memoir to be the establishment of a distinct geometrical theory of the Pippian, the leading results will be found summed up in the nine definitions or modes of generation of the Pippian, given in the concluding number. In the course of the memoir I give some further developments relating to the theory in the memoirs in Liouville above referred to, showing its relation to the Pippian, and the analogy with theorems of Hesse in relation to the Hessian.

VIII. "On the k-partitions of a Polygon and Polyace." By the Rev. T. P. KIRKMAN, M.A. Communicated by ARTHUR CAYLEY, Esq. Received November 13, 1856.

(Abstract.)

The problem relating to the polyace is the reciprocal of that relating to the polygon, and is not separately discussed. By the k-partitions of a polygon, the author means the number of ways in which the polygon can be divided by $(k-1)$ diagonals, no one of which crosses another; two ways being different only when no cyclical permutation or reversion of the numbers at the angles of the polygon can make them alike: it is assumed that the polygon is of the ordinary convex form, so that all the diagonals lie within its area. The author remarks, that the enumeration of the partitions of the polygon and polyace is indispensable in the theory of polyedra, and that in his former memoir "On the Enumeration of x-edra having Triedral Summits and an $(x-1)$-gonal Base," Phil. Trans. 1856, p. 399, he has, in fact, investigated the $(r-2)$-partitions of the r-ace

or r-gon; so that the present memoir may be considered as a completion, or rather an extension and completion, of the investigations in his former memoir. The number of distinctions to be made in the problem of the present memoir is very great; thus, a partition of the polygon may be either reversible or irreversible; and if reversible, then the axis of reversion may be either agonal, monogonal, or diagonal, that is, it may pass through no angle, one angle only, or two angles of the polygon; and in the last case it may be either drawn or undrawn. Again, there may be a single axis or a greater number of axes of reversion: in the case of m such axes, the partition is said to be m-ly reversible; and in like manner an irreversible partition may consist of a single irreversible sequence of configurations, or it may contain such sequence m times repeated, it is then said to be m-ly irreversible. In consequence of this multiplicity of distinctions, the author's final results are necessarily very complicated, and cannot be exhibited in an abstract; they appear, however, to contain a complete solution of the problem, *i. e.* to afford the means of finding, without anything tentative, the number of the k-partitions of an r-gon when k and r are given numbers.

December 18, 1856.

The LORD WROTTESLEY, President, in the Chair.

The following communications were read:—

I. "On the Scelidothere (*Scelidotherium leptocephalum*, Owen), a large extinct Terrestrial Sloth." By Professor R. Owen, F.R.S. Received October 30, 1856.

(Abstract.)

The extinct species of large terrestrial Sloth, indicated by the above name, was first made known by portions of its fossil skeleton having been discovered by Charles Darwin, Esq., F.R.S., at Punta Alta, Northern Patagonia. These portions were described by the